SEPTEMBER
1968
45¢

Live Steam

THE MONTHLY MAGAZINE FOR ALL LIVE STEAMERS AND LARGE-SCALE MODEL RAILROADERS

30" Gauge Steam in Australia

Let's Save The D&RGW Narrow Gauge

Live Steam
magazine

SEPTEMBER 1968 VOL. 2 NO. 9

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COVER PHOTO

Thirty - inch gauge 2–6–2T fighting the 1 in 30 grade on the way up to Menzies Creek as Australia's "Puffing Billy Preservation Society" keeps steam alive on that continent.

SUBSCRIPTIONS start with January, May or September issue: $4.50 per year in U.S.A. and Canada (U.S. Funds), $5.50 per year (U.S. Funds) in other countries.

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30" gauge keeps running in Australia, thanks to the

Puffing Billy Preservation Society

by John W. Mann

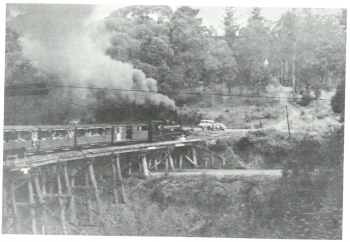
A Live Steam meet in the Southern part of the country always includes a short side trip to the 2'6" gauge steam trip just out of Melbourne before heading back to Sydney. It's an experience that's hard to forget, especially the stretch of 1 in 30 grade!

The railway was rebuilt and reopened by voluntary effort. It is a branch line of the Victorian Railways but is operated, staffed and maintained by the *Puffing Billy Preservation Society* under the supervision of the Victorian Railways Department who also provide certain paid staff including the driver, fireman and guard.

The 8¼ mile trip from Belgrave to Lakeside takes about 50 minutes because of the grades encountered. The track is laid with 60# rail (66# on curves) and passes over a trestle which is 280 feet long and 42 feet high.

Equipment includes three 2–6–2T class NA locomotives, a class NB compartment car, NBH excursion car, NC guard's van, NBC composite passenger and guard's van and a class NQ open wagon. Sitting on the window sill is the normal style for the kids and it is quite a sight with 200 or 300 legs hanging out!

The line operates only on public and school holidays and, surprisingly enough, they make a fair profit. After meeting operating costs, the remaining revenue is used by the Society for the maintenance and improvement of the railway and its facilities.



Smoke hangs low over the train as it crosses the trestle just as the start of the "up" grade on a damp, dreary day. The train is usually filled to near-capacity but the weather has kept the number of passengers low on this particular trip.

"Puffing Billy" rests at Emerald station. There are three of these identical engines left and they take turns working the trains.

Australia's thirty-inch gauge 2–6–2T drifts into Menzies Creek station with a train-load of passengers. The "Puffing Billy Preservation Society" maintains and operates this equipment to keep the past alive on that continent.

Slogging its way up the grade to Clematis station, the diminutive 2–6–2T provides all the sights and sounds and smells that delight the passengers.

building the RARITAN

by William H. Morewood

When beginning work on the cylinders (6–1), note that the casting is not symmetrical and one face is marked "Side." This face goes against the frame and the other is the valve face.

The drill jig (6–4) is used for drilling the cylinder mounting holes in the frame, in the cylinders and in the exhaust tee.

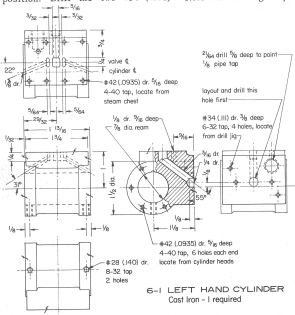
First, locate the button in the forward axle slot in the frame. See that the edges of the jig line up with the edges of the frame and clamp it in position. Drill the two #34 (.111) holes in the frame. Remove the jig and open the holes up to #28 (.140) diameter.

Position the exhaust tee on a pin in the center hole, see that the top of the tee is parallel to the top of the jig and clamp in place. Drill the two #34 holes in each end of the tee. Remove the jig and open the holes up to #28 (.140) diameter.

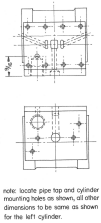
Position the cylinder on a shoulder pin again located in the center hole. See that the valve face is parallel to the edge of the jig and clamp in place. Note that the right cylinder must be placed on one side of the jig and the left on the opposite side. Drill the four #34 holes and one 3/16 hole to locate the 1/8 pipe tap for the steam line fitting. Remove the jig and tap the four 6–32 holes and the one 1/8 pipe tap.

A main point to keep in mind when working the rear cylinder head (6–5) is to locate the block for the crosshead guides as accurately as possible. The closer this is held, the less fitting will be required on the crosshead guides.

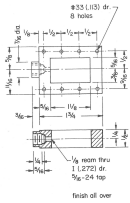
cylinders



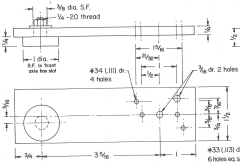
6-1 LEFT HAND CYLINDER
Cast Iron - 1 required



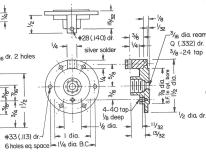
6-2 R.H. CYLINDER
Cast Iron - 1 required



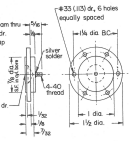
6-3 STEAM CHEST
Cast Iron - 2 required



6-4 DRILL JIG
C.R. Steel - 1 required



6-5 REAR CYLINDER HEAD
Brass - 2 required



6-6 FRONT CYLINDER HEAD
Steel - 2 required

PART SEVEN

SO YOU WANT TO BUILD A LIVE STEAM LOCOMOTIVE

CHAPTER 9

FABRICATING THE COPPER BOILER

by Joseph F. Nelson

When the Live Steam locomotive builder wishes to test his ability as a worker of heavy gauge sheet metal, he may try fabricating his boiler by forming the boiler barrel and the various sheets from flat sheet copper. Then he may rivet the various units together and finally silver solder the assembly into a pressure-tight component. To build the wagon top boiler of a true Belpaire boiler from sheet copper requires a lot more planning, more tools and more parts fitting than the boiler built from a copper tube and then molded to prototype form with insulation. The "Simon Pure" who won't consider anything but a true Belpaire boiler on his proposed K–4 yet, hasn't the ability or tools to form 1/8" thick sheet copper (for 1" scale) will have a problem with his conscience when he gets around to the boiler. He will either put his conscience in his pocket and dummy the Belpaire, or he will tell himself that he is a man of principle and that if he can't have a true Belpaire, he won't have any. For the record, he will say that so many things have to be done around the house that he just can't find time to complete the engine. He, therefore, has some partially finished castings for sale.

If the locomotive builder wishes to build a highly contoured boiler and has the skill and available tools, he should go ahead and build it; otherwise, he should forget it and dummy the outline over a copper tube or pick some prototype that has a straight boiler. Just remember the fable of the dog and the bone; It is better to have one bone than to reach for an image of the second one and end up with nothing.

LAYING OUT THE BOILER SHEETS

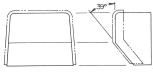
When laying out the boiler barrel conical and tubular sections and the other sheets that may have one or more radii or riveting flanges, cut out paper templates of the forms, making certain to provide for bend allowance. Where the end of one formed unit will butt against the end of another formed unit, allow enough extra metal to permit filing to fit. Glue the template to the copper sheet and then cut out the form with a saber saw or a deep throat DoAll metal curting band saw. In order to take advantage of space and have a minimum of waste, it would be advisable to arrange all the templates on the copper sheet before doing any cutting. It may be necessary to reverse a template now and then to save metal. The skilled worker may do his layout directly on the copper after painting it with Dykem Steel Blue. Use a scriber to mark the outline of the forms. CAUTION! Do not scribe the body of the forms since a scribe mark on a surface under pressure may develop into a crack. Use a pencil for further layout. Dykem Steel Blue may be removed with lacquer thinner or M.E.K. (Methyl-Ethyl-Keytone).

FORMING BLOCKS

Forming blocks must be made for all sheets that have flanges for riveting; i.e., backhead, rear firebox sheet, front and rear tube sheets, throat sheet and, if the boiler is a Belpaire, for the Belpaire shoulders. Due to the difficulty in holding this part during forming, it is better to fabricate it from parts than to form it from one piece of sheet copper. Since the firebox sheet and the Belpaire boiler sheet are formed on the press brake, forming blocks for them will not be required. Where a combustion chamber is used, it may be formed as an extension of the firebox sheet. However, owing to the difficulties involved in the fabrication of a riveted construction combustion chamber in 1" scale and smaller scale engine, it would not be recommended for this reason and for other reasons. On the other hand, it would be entirely practical from all angles in a steel or stainless steel boiler with welded construction.

As previously mentioned, do not depend too much on the silver solder to hold the pressure stress in the boiler joints, but figure sufficient copper rivets and/or silicon bronze screws to give a safety factor of 4. Silver solder will then seal the joints and around the rivets and screws. Whatever silver solder capillaries into the joint will add to the strength of the joint to bring the safety factor well above 6. It is to be recognized that a man who is skilled in silver soldering can make a lap joint that is stronger than the sheets being joined. However, the novice cannot guarantee that he can make the silver solder capillary into the joint, rather than be applied to the joint as a seal. Handy & Harman, the manufacturer of Handy Flux and silver solder states that 0.0015" to .003" is the best clearance to promote capillary action of silver solder. However, a good man can get silver solder into a joint from practically zero clearance to 0.005". Since it is impossible for the novice to work heavy gauge to such close tolerances, and, also, since the solidus and liquid points of Easy-Flo 45 are so close together that it cannot be built up over a gap, some other means of handling this problem must be used. Sil-Fos may be used where a build up is required. It has a higher melting point than Easy-Flo 45 and has also a greater temperature spread between the solidus and the liquid states. When properly heated, it will flow into a joint like Easy-Flo 45 and can be used with Easy-Flo 45 since the two silver solders are compatible. It may be used with or without flux and where sufficient heat is available, it can be used to silver solder the complete boiler. It also has the advantage of being considerably lower in price than Easy-Flo 45; however, the novice should not consider using it to silver solder the whole boiler until he has had a lot of experience using both Easy-Flo 45 and the Sil-Fos. Steel can be silver soldered with Sil-Fos but it is not recommended since it is reputed that steel that is silver soldered with Sil-Fos becomes brittle. Fos-Copper is also satisfactory for "hard soldering" copper but it is not recommended for the novice since it requires a lot more heat and a lot more skill to keep from burning up the copper.

When preparing a boiler for silvering, everything must be clean and bright. Many people paint flux on boiler joints before riveting them together. This is wrong! It is wrong because of the time lapse between boiler assembly and silver soldering which is sometimes months. This

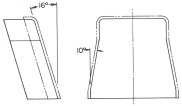


Maple Forming Block

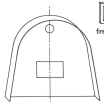
REAR TUBE SHEET

Maple Forming Block

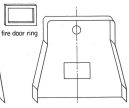
FRONT TUBE SHEET



Maple Forming Block

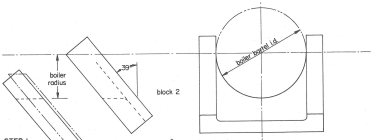


Backhead Sheet – Radial Stay



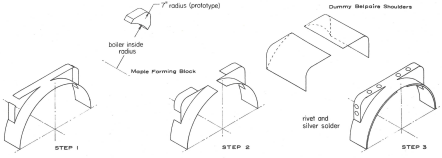
Backhead Sheet – Belpaire

BACKHEAD SHEET

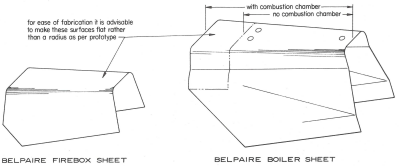


THROAT SHEET

COPPER BOILER DETAILS

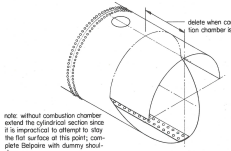


DUMMY BELPAIRE SHOULDERS


for ease of fabrication it is advisable to make these surfaces flat rather than a radius as per prototype
with combustion chamber
no combustion chamber

BELPAIRE FIREBOX SHEET

BELPAIRE BOILER SHEET


delete when combustion chamber is used.
note: without combustion chamber extend the cylindrical section since it is impractical to attempt to stay the flat surface at this point; complete Belpaire with dummy shoulders.

CYLINDRICAL SECTION K-4 BOILER

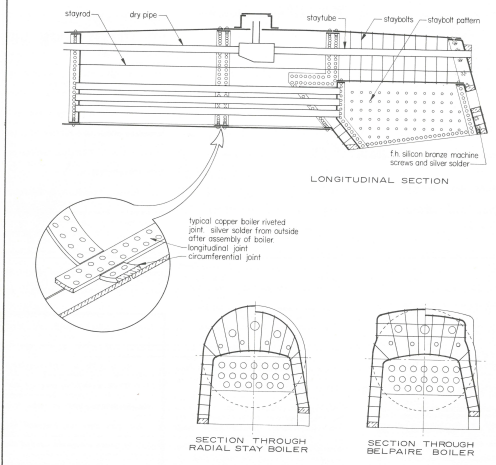
MUD RING - K-4

COPPER BOILER DETAILS

JRS/ed

gives time for the flux to start corrosion in the joints. Paint flux on all the joints and the rivets just before silver soldering. The melting flux will then capillary into the joint and when the silver solder melts later, it will flow into the joint after the flux. The torch should be applied to the joint and not the silver solder rod or wire. Melt the silver solder by touching it to the hot joint and the rivets. Where bronze castings are used, avoid over heating; apply only enough heat to the casting to melt the silver solder and run it into the joint. This is important since overheating will burn out the zinc and make it worthless. CAUTION! Avoid breathing the fumes when silver soldering since the flux vapor is very toxic.

When the boiler has cooled after soldering, wash it inside and out with water, (hot water preferred) then plug the openings and test it for leaks. Minor leaks in bronze castings may be calked; however, major leaks must be cleaned, fluxed and then re-soldered. The tender hand pump may be used to hydrostatically test the boiler for leaks. The pressure for testing should go to 300 PSIG for the leak test. After that the test pressure hydrostatic test is a minimum of 1½ times the safety valve popping pressure. Some hydraulic forming may be noticed on copper boilers at 300 PSIG since annealed copper is very ductile; however, this should cause no problem since the staybolts are doing the holding and not the flat sheet copper.



COPPER BOILER DETAILS

ERNEST F. STALDER, one of Chicagoland's first Live Steamers, died August 20th. Ernie was born in Switzerland on July 8th, 1901, the son of an engineer on the Swiss Railroads and had been a tool and die maker until his retirement two years ago. He made experimental diesel injector nozzles in his own basement shop for various items.

Ernie was very proficient in working stainless steels and used this material to construct two O-gauge and two 3½" scale Live Steam locomotives, which have run on many of the club tracks.

At Kiddyland in Melrose Park, Illinois, Tom Hill's 14" gauge Wagner Hudson flew black flags on August 25th in respect for Ernie who had often pulled the throttle.

His enthusiasm for Live Steam drew many into the hobby and he will be missed by his legion of friends who extend their sympathies to his wife, Margaret, and his two sons.

Regular Run Days

GOLDEN GATE LIVE STEAMERS
Every Sunday, weather permitting
2½" – 3½" – 4¾" – 7¼"
Ron Downer, Secretary
1274 36th Avenue
San Francisco, Calif. 94122

JAMUL VALLEY RAILROAD
3rd Sunday of each month
7¼" gauge
Harry F. Haas
Route 1, Box 47A
Jamul, California 92035

LOS ANGELES LIVE STEAMERS
1st Saturday & Sunday each month
3½" – 4¾" – 7¼"
William Harper, Secy.
4 Rawhide Lane
Rolling Hills Estates, Calif. 90274

NEW JERSEY LIVE STEAMERS
1st & 3rd Sunday each month
3½" – 4¾" – 7¼"
Ralph Greene, Secretary
Phone 201 – 353-4424
845 Kilsyth Road
Elizabeth, N. J. 07208

RIVERSIDE LIVE STEAMERS
4th Saturday & Sunday each month
7¼" gauge
Francis M. Smith, Secretary
P. O. Box 5512
Riverside, Calif. 92507

SOUTHERN CALIFORNIA LIVE STEAM CLUB
3rd Sunday each month
3½" – 4¾" – 7¼"
K. G. Kepner, Secretary
2764 Maple
Rialto, California 92376

WAUSHAKUM LIVE STEAMERS
2nd Sunday each month 8 a.m.-4 p.m.
3½" gauge
Wendell C. Bishop, Secy.
52 Pond Street
Natick, Mass. 01760

1½" STEEL RAIL

Lou Bandy of the Cincinnati Cinder Sniffers, Inc., advises that they have located a small mill in Cincinnati that will roll 1½" scale rail in 1010–1020 steel.

The rail will weigh about .85# per foot and an order of 10 to 15 tons will be required in order to initiate the order. Cost will be approximately 25¢ to 30¢ per foot f.o.b. Cincinnati and will cover the cost of the rolls, straightening, etc.

If you are interested, contact Lou Bandy, 854 Reynard, Cincinnati, Ohio 45231 for further information.

NEW CALDWELL CATALOG

Hand operated shapers; a milling machine in kit form; six metal lathes varying in size from small portable models for apartment dwellers to the Myford Super 7 gap-bed lathe . . .

Stationary steam engines offered for the first time anywhere include both single cylinder and compound designs to provide a logical introduction to machining . . .

Steam tractors from 15" to 46" in length provide interesting projects linking with the past . . .

Model gasoline engines for airplanes, boats or stationary applications . . . both air and water cooled types ranging from a 6cc model airplane engine to a two cylinder, four cycle, water cooled, overhead valve 30cc engine . . .

A full range of Live Steam locomotives from 2½" to 10¼" gauge in finished or kit form from a reknown firm of English model makers with new American prototype designs forthcoming . . .

Steam fittings such as valves, pressure gauges and connections to make construction of any model easier . . .

A clock kit; books of interest to model-maker and machinist; electric and alcohol fueled steam toys . . .

All of these things can be found in the new catalog now available from Caldwell Industries, Box 170, Luling, Texas 78648 for $1.00!

Their line, most of which is made in England, offers for the first time on the American market many of the excellent items which have made metal-working an extremely popular pastime in the United Kingdom. Emphasis is placed on supplying the amateur machinist with professional quality products engineered for the amateur in areas completely neglected by manufacturers of industrial equipment.

We welcome this new firm to the list of suppliers to the Live Steam hobby and wish them every success in their new venture.

ATTENTION COLORADO LIVE STEAMERS

All Live Steamers in Colorado who are interested in forming a club for 1½" Narrow Gauge and 1" Standard Gauge scales are invited to contact J. Kent Bolerjack at 3228 West Tufts Avenue in Englewood, Colorado 80110 Phone 303 – 794-6689.

Sounds like a very likely location for modelling Narrow Gauge prototype equipment and with Kent's enthusiasm for the D&RGW Narrow Gauge (see the *mail stop* column, page 11) something good is bound to come from his invitation!

BUFFALO AREA LIVE STEAMERS FORM CLUB

The *Niagara Frontier Live Steamers* are a group of fourteen Live Steamers in the Buffalo area who have formed the club with the intention of building 3½", 4¾" and 7¼" track on a site to be selected.

They meet on the first Sunday of each month at various member's homes pending construction of a club house. One member has a 7¼" loop, another has a 7¼" loop under construction and a third is building a 3½" elevated track.

Officers are Fred Bowman, President; Edward Tanski, Vice President; Bruce Rickerson, Secretary; Arthur Rickerson, Treasurer.

Membership is open to anyone wanting to join and associate memberships are available for those living too far away to attend regular meetings and work sessions. For further information contact Bruce Rickerson, Secretary, 21 Sandstone Drive, Buffalo, N. Y. 14225, phone 716 – 892-0263.

NORMAN MOTTSHAW of Port Arthur, Ontario, passed away on August 3rd, 1968, at the age of 65 years.

Norman was a meticulous craftsman and his work on his Live Steam models of English and New York Central locomotives brought praise from all who saw them.

He was born in England but had lived in Port Arthur for the past 54 years where he served the Public Utilities Commission for 28 years. He was bandmaster of HMCS Griffon Band, active in model railroad clubs and was a member of the AF and MF Lodge.

The condolences of all who shared Norman's interests go to his wife, Flora, and his son and daughter.

mail stop

HELP SAVE THE D&RGW NARROW GAUGE

If possible can you publish an editorial or something asking your readers to get signers to help petition the National Park Service to buy and operate the D&RGW's Narrow Gauge from Alamosa to Farmington, N. M.

The D&RGW wants to abandon all but the Silverton section, and in time they will scrap that too.

If at all possible we are going to save our Nation's last steam railroad for our children and grand-children. The cable cars of San Francisco are a good example of what can be done. We know it is an up-hill fight, but if every railfan will get his neighbors and friends to sign a petition to save the Narrow Gauge, we can do it.

R. KENT BOLERJACK
3228 W. TUFTS AVENUE
ENGLEWOOD, COLO. 80110

As background to Mr. Bolerjack's letter, we are reprinting a portion of another letter to Mr. Bolerjack from Mr. Kent Ziebarth, Director of Intergovernmental Programs for the State Planning Office in Santa Fe, New Mexico.

"The position of the State of New Mexico is that of opposing abandonment for reasons of economic importance to the area. However, there is a definite likelyhood that the railroad will be permitted to abandon, and we are trying to explore other alternatives in the case that abandonment is successful. We are making an effort to preserve the railroad as a national monument. A petition supporting this effort is enclosed; you may assist us by obtaining signatures. You may lengthen the petition by attaching additional sheets to the back as necessary."

The petition supplied by Mr. Ziebarth reads as follows:

George B. Hertzog, Jr.
Director of National Park Service
Interior Building
Washington, D. C. 20240

Dear Mr. Hertzog:

Penetrating the massive Rocky Mountains runs the last remaining coal-fired, steam operated, narrow gauge railroad in the United States. An outstanding variety of topography, geology, flora and fauna is along its route. Much of the land is accessible only by the railroad and is scarcely touched by civilization. Yet at points along the way lie railroad established towns, such as Durango, Colorado, and Chama, New Mexico. The United States' highest railroad pass, 10,200 ft. Cumbres, high above Chama, is reached via the steepest sustained railroad grade (4%) in the United States. Cumbres also has the only turn-around "Y" covered with a snow shed. At Chama is the last remaining operating coal tipple in the United States, in connection with the last complete 1880 era railroad yard.

From Chama to Durango the railroad passes through the fascinating Jicarilla, Apache and Ute Indian Reservations and skirts the new Navajo Lake Reservoir, one of the finest resort areas developing in the San Juan Basin. Forest Service areas border much of the route; here, the railroad being the only access, could provide a means of developing excellent fishing, hunting, skiing and similar facilities. West of Antonito, Colorado, with the railroad clinging to the precipice, is the forbidding 1000 ft. deep Toltec Gorge, of significance equal to that of the Black Canyon of the Gunnison.

Embedded deep in the history of Colorado and New Mexico, the Denver & Rio Grande Western Narrow Gauge Railroad was undoubtedly the most important single fact in the life and growth of Southern Colorado and Northern New Mexico.

Abandonment and relegation to the history books is imminent for this uncommon railroad so prominent in the development of the West. As a unique American national asset having great historical and scenic value, preservation of the Denver & Rio Grande Western Narrow Gauge Railroad would provide enjoyment and education for all.

The railroad has indicated a desire to sell the line, equipment and rolling stock to any proper authority for $1.00 and will train personnel and offer shop facilities at cost. Operation by a concessionaire would be profitable as demonstrated through success of the daily Durango to Silverton, Colorado, sight-seeing train each summer.

We the undersigned make the following proposal:

"Establishment of a National Monument encompassing the entire Denver & Rio Grande Western Narrow Gauge Railroad, commencing at Alamosa, Colorado, and extending a distance of approximately 270 miles to Silverton, Colorado."

To elaborate on the above synopsis, we are prepared to furnish a detailed history, photographs, acquisition data, maps and all other information required to provide for the establishment of the Denver & Rio Grande Western Narrow Gauge Railroad as a National Monument.

We respectfully request your study of this proposal.

LIVE STEAM Magazine heartily endorses this project by Live Steamer Kent Bolerjack and by the State of New Mexico to preserve the Denver & Rio Grande Western Narrow Gauge Railroad. We would encourage all of our readers to obtain the signatures of as many interested individuals (along with their address) and send them to Kent Bolerjack at the address above, for attaching to the petition. They should be on a sheet of 8½ x 11 ruled paper for convenience. Each Live Steam Club, too, should discuss and support this project with as many signatures as possible. Let's not wait until it is too late . . . do it now!

— W. C. F. —

...from the cupola

Boy! How the time flies by! It hardly seems possible that this issue begins the third year of publication for LIVE STEAM.

We want to say a word of thanks from Doris, Paul and myself for the notes and comments that came in by the hundreds along with the renewals during the past few weeks. The fact that you have stuck with us during these trying times is most gratifying. The notes of appreciation and compliment add a thick frosting to the cake and keep the feeling of personal association with our readers even though the number keeps increasing daily. We hope that LIVE STEAM will always be able to remain on that key.

Rather than list the projects we have in store for future issues, we'd like to take a line or two to mention, if we may, some of the things we would like to see in LIVE STEAM.

There are many Live Steamers who could add immeasurably to the content of this publication who, for some reason or another, have remained silent. Their experiences and discoveries and thoughts could add a wealth of data to the meager writings available to our hobby.

We'd like to see some photos of activity in *all* areas. There are over 50 Live Steam Clubs but 3/4 of them have never submitted a photo of their facilities or members or equipment.

We would like to see as much detail information as possible submitted with photos of your engine. We have several that could be worked up into feature articles if we could get more information. We can handle the drawings and arrangement of the information if we but know the facts. Don't worry about "writing an article" but please send us everything you can so we can give a complete story. Every time we have published a photo without the basic dimensions we have a flood of correspondence from readers who are interested enough to want to know more. We want to do justice to the presentation of a job that has taken you years to complete.

One more item: many mentioned the hope that we would be able to continue LIVE STEAM. We have every intention, be the Good Lord willing, to not only continue but to improve and enlarge the scope of this operation. Our new office space should be ready to move into in a matter of weeks now which will give us facilities to get better organized and to add a second drawing board. (One for the right hand — one for the left!) With tradesmen out of the way and their work complete we should be able to settle down to the pleasant task of preparing LIVE STEAM monthly.

— W. C. F. —

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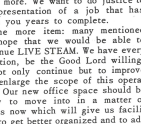

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